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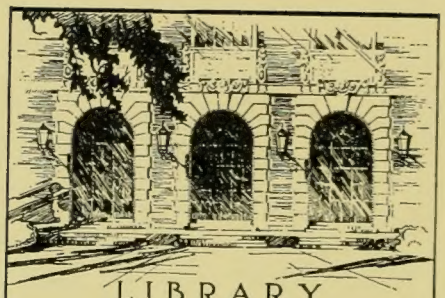

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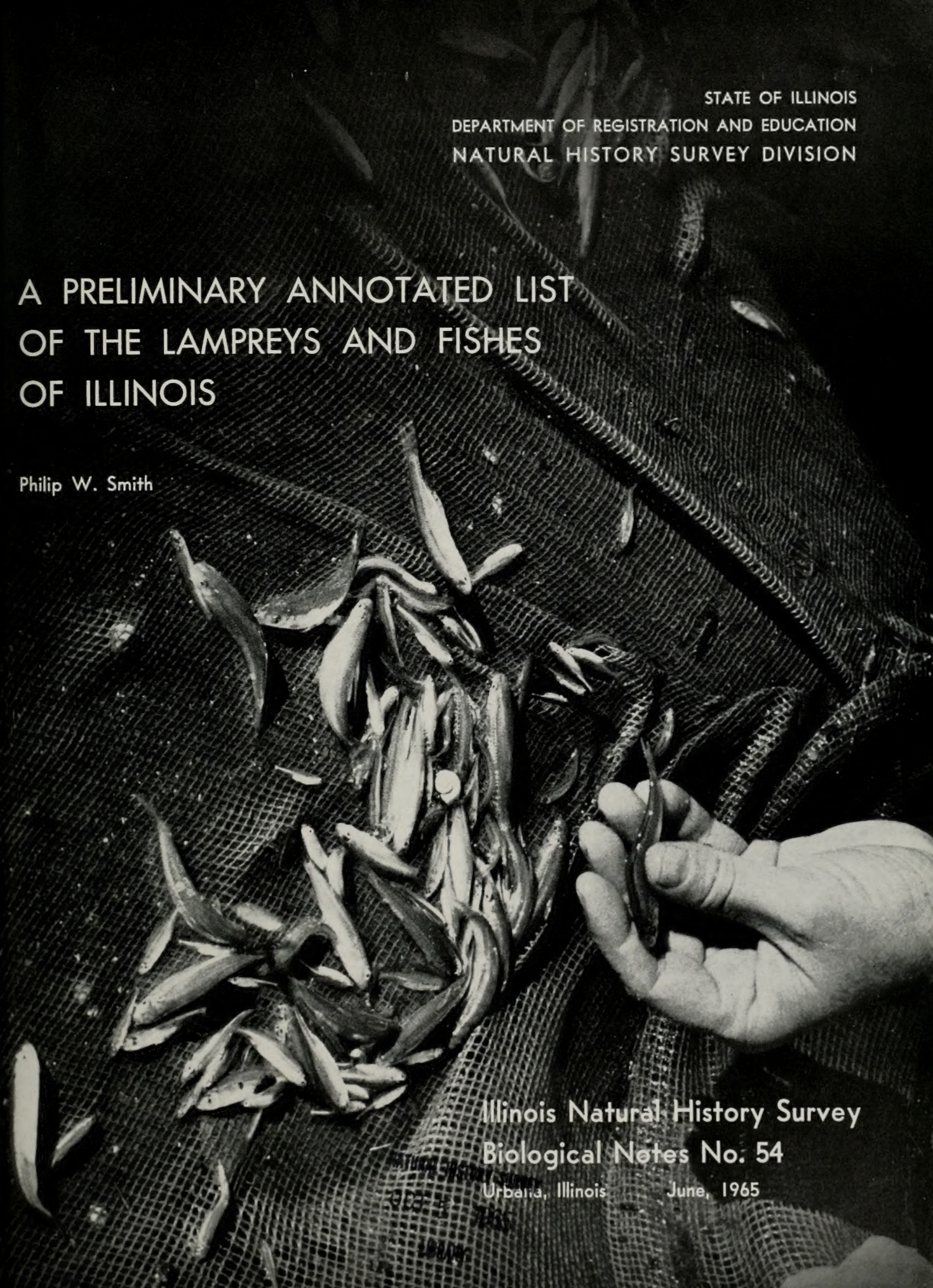
A PRELIMINARY ANNOTATED LIST OF THE LAMPREYS AND FISHES OF ILLINOIS

Philip W. Smith



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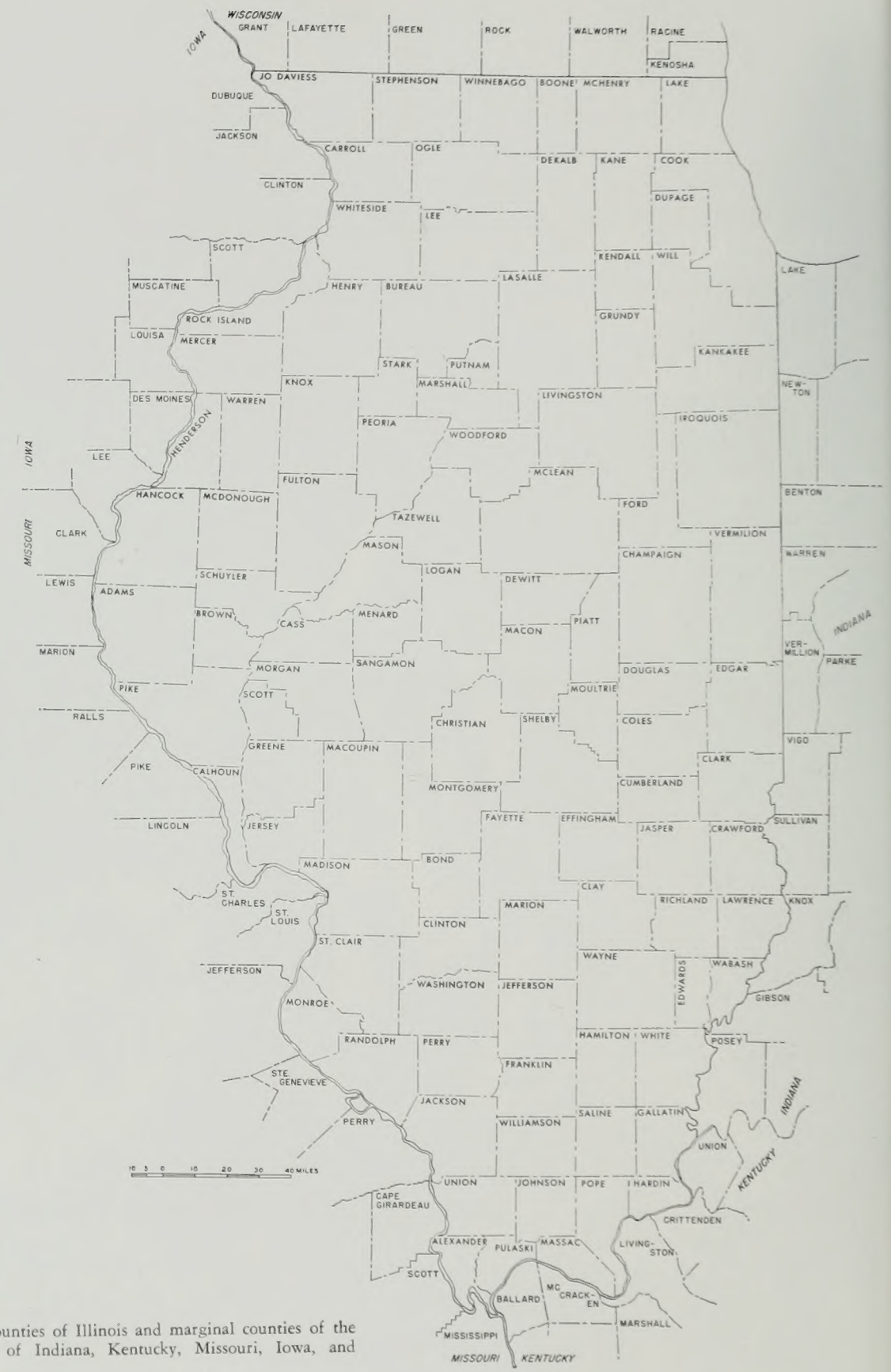

FIG. 1.—The counties of Illinois and marginal counties of the neighboring states of Indiana, Kentucky, Missouri, Iowa, and Wisconsin.

A PRELIMINARY ANNOTATED LIST OF THE LAMPREYS AND FISHES OF ILLINOIS

Philip W. Smith

THE PUBLICATION AT THIS TIME of a preliminary annotated list of Illinois lampreys and fishes has two primary objectives. It can provide field biologists with a critical and updated list of the known species in the state and a brief indication of the present distribution of each one and, at the same time, it can alert field workers to critical areas where additional collecting is desirable, to problematical records that need substantiation, and to other problems that warrant investigation. Perhaps equally important, it can summarize and report to them, without undue delay, new information, some of which is the result of their own collecting.

In addition to the classic *Fishes of Illinois* by Forbes & Richardson (1908), five annotated lists of Illinois fishes have been published (Nelson 1876, Jordan 1878, Forbes 1884, Large 1903, and O'Donnell 1935). These papers, most of which were remarkably thorough for their time, were based on considerably less field work than is possible with transportation facilities of today. Much of the nomenclature and some of the concepts of the authors are now out of date. A new *Fishes of Illinois,* aimed at discerning changes in distribution, is in preparation, but its appearance must await termination of the current ichthyofaunal survey of the state. The present list, although essentially a progress report, contains a substantial amount of new distributional data, including several new records for the state.

ACKNOWLEDGMENTS

Although the ichthyofaunal survey was initiated several years ago, extensive field work did not begin until the summer of 1962. The success of the program since that time has been due in large part to the unstinting effort of my assistant, Mr. Marvin E. Braasch, and to splendid cooperation from Mr. A. C. Lopinot and his staff of biologists in the Division of Fisheries of the Illinois Department of Conservation. During this time a number of people and agencies have contributed dozens of important collections and much helpful information. Because the number of contributors is so large, acknowledgment for their contributions and cooperation must await the forthcoming state report.

For critical perusal of the manuscript, I am grateful to Mr. Lopinot; Mr. Loren P. Woods, Chicago Natural History Museum; and Dr. Reeve M. Bailey, University of Michigan Museum of Zoology. I owe a special debt to Dr. Bailey for graciously checking identifications and providing counsel throughout the past several years. For calling my attention to the occurrence of *Menidia audens, Ammocrypta vivax,* and *Etheostoma stigmaeum* in Missouri counties adjoining Illinois and for permission to cite these records as hypothetical additions to the Illinois fauna, I am indebted to Mr. William L. Pflieger and the agency with which he was formerly associated, the Missouri Conservation Commission. For counsel regarding the distribution of certain Ohio River fishes, I am grateful to Dr. W. L. Minckley of Arizona State University.

The maps were adapted by Miss Marguerite Verley, formerly with the Illinois Natural History Survey, from a base map drawn by Mr. John W. Brother, Jr., of the Illinois Water Survey. Final drafting was done by Mr. William L. Taylor of the Natural History Survey. The manuscript was edited by Mr. James S. Ayars, Technical Editor of the Survey, who made numerous helpful suggestions in the preparation of the paper. The cover photo was taken by Mr. William E. Clark, formerly staff photographer.

METHOD OF TREATMENT IN THE ANNOTATED LIST

The 177 species of lampreys and fishes known to occur at present in Illinois waters are grouped under family names, set as center heads and arranged in phylogenetic sequence. Within each family, however, genera and species are listed in alphabetical order. Except where Dr. Bailey has advised certain departures, scientific names used are those currently employed by a majority of American ichthyologists; with a few exceptions, common names are those recommended in the official list (Bailey 1960) by the joint committee on fish names of the American Fisheries Society and the American Society of Ichthyologists and Herpetologists. Subspecies names are used when only one subspecies of the species is known to occur in Illinois. When more than one occurs in the state, the word *subspecies* follows the name of the author of the species name, thus connoting that the relationships of the subspecies remain to be studied.

For each species, a concise statement regarding its current distribution in the state is given. The term *generally distributed* implies that any suitable habitat, within the prescribed area, should be expected to yield specimens with a reasonably thorough search; *occasional* that suitable-appearing habitat may or may not yield specimens even after prolonged search; and *sporadic* that the encountering of specimens of a given species cannot be predicted at all. No connotation of abundance is intended, for a generally distributed species is sometimes relatively uncommon

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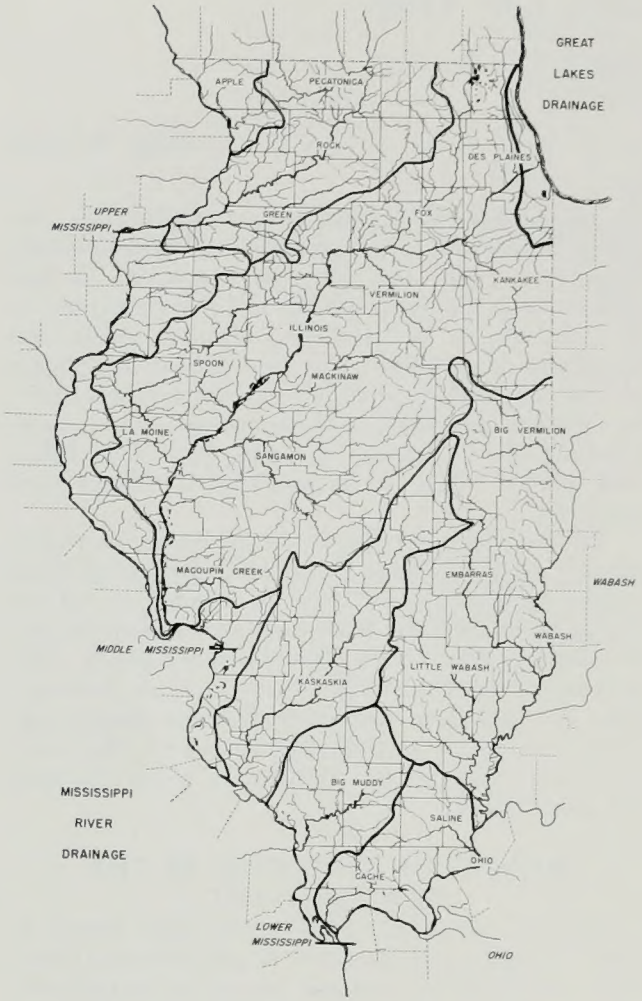

FIG. 2.—Drainage systems and some of the principal streams of Illinois. The heavy curved lines indicate drainage systems of three categories, based on size: (1) the Great Lakes and the Mississippi River; (2) the Wabash, the Ohio, and the Mississippi (Upper, Middle, and Lower); and (3) other rivers named. The short, heavy line to the right of each of the designations *Upper Mississippi, Middle Mississippi,* and *Lower Mississippi* shows the downriver limit of one of the three sections of the river as understood in this paper.

throughout its range, and a species listed as sporadic may be locally abundant.

Distribution is usually expressed in terms of sections of the state, such as northern half, southern fourth, and extreme northeastern part (Fig. 1). In some instances, distribution is stated in terms of specific drainage systems or waters, such as Kankakee drainage system, upper Wabash drainage system, Lake Michigan, and middle and lower Mississippi River. References to such rivers as the Wabash and Mississippi are to the parts that border Illinois. For example, *lower Mississippi* refers to that part of the Mississippi River between the mouths of the Missouri and Ohio rivers (Fig. 2). For species known in Illinois from only one or a few records, the name of the stream and county involved are usually given, and attention is called to the need for substantiating records. Drainage boundaries and some of the principal streams of the state are depicted in Fig. 2.

Statements concerning range are, for the most part, based on material collected since 1950 and deposited in the Illinois Natural History Survey collections. The statements are meant to give what I believe to be the current distribution of the species in the state. Comments on habitat are given for certain species rather rigidly restricted to certain types of water, but no attempt has been made to describe habitats for most of the species.

A list of more than 30 problematical species is included in this report. The annotations for these species, all hypothetical in the Illinois fauna, are self-explanatory. For the most part, the list includes fishes presumably extirpated or at least those that have not been collected in Illinois waters within the past 25 years; old and unsuccessful plantings of exotic species that have been recorded in the Illinois literature; recent introductions, the status of which is still unknown; and species known to occur in marginal areas

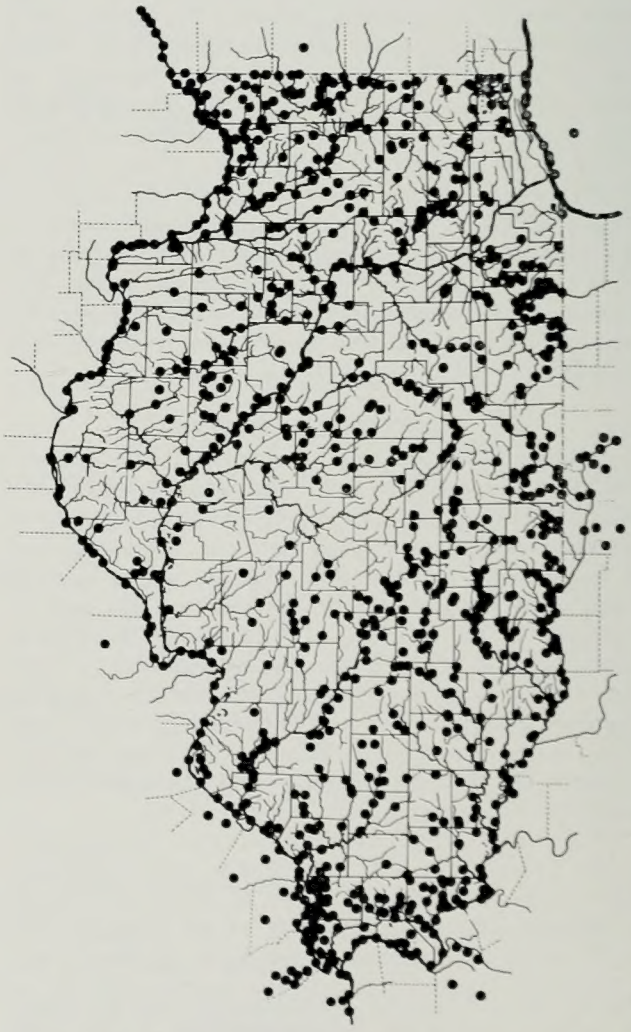

FIG. 3.—Location of collections taken, 1950 to date. Each dot represents 2 to 50 species of fish from a site.

of adjacent states but as yet unrecorded from Illinois. (Because of the extreme narrowness of marginal Vermillion County, Indiana, and Livingston County, Kentucky, the adjacent counties—Fountain and Parke in Indiana and Marshall in Kentucky—are also regarded as marginal to Illinois.) When recent records for these problematical species are extant in the Illinois Natural History Survey collections, they are indicated by the initials INHS. Some of the species now believed extirpated will likely be rediscovered in Illinois, and some of the species known in marginal counties of adjoining states will probably be found within our boundaries; others listed as problematical probably will not be found, but it is hoped that the appearance of their names in this paper will stimulate search for them. Additional information on the status of any of these species will be provided upon request.

The following names, all currently valid and applied to species that do not occur in Illinois, found their way into the older Illinois check lists through misapplication of names, through misidentification of specimens, or through unfounded predictions that certain species might be found to occur in the state: *Salmo salar, Chrosomus neogaeus, Hybopsis dissimilis, Notropis analostanus, Notropis ardens, Notropis galacturus, Notropis pilsbryi, Phenacobius teretulus, Semotilus corporalis, Lagochila lacera, Moxostoma breviceps, Ictalurus catus, Noturus insignis, Gambusia nobilis, Lepomis auritus, Etheostoma fusiforme, Etheostoma jessiae, Etheostoma tippecanoe,* and *Etheostoma variatum.* With the present state of our knowledge, all of them can be deleted from the list of Illinois fishes.

DESIDERATA

Since this paper is a progress report, criticisms and efforts to make obsolete the information presented in it are earnestly solicited. However, documentation in the form of preserved specimens accompanied by full collecting data is requested for any recommended revision or emendation of information contained in the present list.

Scientific collecting permits to take fishes by minnow seine must be secured annually from the Illinois Department of Conservation, Springfield. Fishes collected should be dropped into approximatelly 10% formalin while they are still alive. Generally those under 10 inches in length need no further care; larger specimens should have a small slit alongside the belly to enable preservative to enter the body cavity. Each collection should have a label, written in pencil or waterproof ink on good bond paper, giving the following essentials: name of stream or lake, exact distance and direction from nearest town, name of county and state, date of collection, and name of collector. Habitat data, which are quite helpful, should be included. After the specimens have been fixed in formalin for approximately a week, they may be placed in plastic refrigerator bags containing moist rags or a little fluid, packed in a box or mailing cylinder, and shipped parcel post to the Section of Faunistic Surveys, Illinois Natural History Survey, Urbana. Identifications on all specimens submitted will be reported to the sender.

First on the list of desiderata are those species listed as problematical. Particular attention is called to those fishes known to occur in marginal counties of adjacent states but as yet unrecorded from Illinois and to those once known in Illinois but now presumed to be extirpated. Almost half of these species can reasonably be expected to be discovered, or rediscovered, when the state has been more thoroughly investigated. It is possible, though not probable, that some completely unexpected fishes—species that are not cited in the Problematical List—may also be found.

Of almost equal significance are those species whose occurrence in Illinois is indicated as needing substantiation, particularly those having records based on only one or a few specimens. Additional preserved specimens of species listed as *sporadic* are likely to be of greater value than those listed as *occasional,* but specimens falling in either category are almost certain to be worthwhile. Obviously any records that require revision of the distributional comments are valuable, even though the species at hand may be generally distributed in another part of the state.

In order to show the areas within Illinois that need special attention, the location of the approximately 1,000 stations sampled since 1950 has been plotted (Fig. 3). Thus, any stream or section of the state lacking dots is a distributional hiatus. Preserved specimens of any species from such gaps are desirable.

The most useful collections are those from a variety of habitats at each station. Riffles upstream from the minnow seine should be vigorously agitated, pools of various depths and bottom types seined, and attempts made to capture any fishes hiding in marginal vegetation or in brush piles in the water. The number of species acquired at any one locality depends upon the variety of habitats present at that locality and the thoroughness with which each habitat is sampled. In our experience, the number of species per site, when a standard minnow seine is used, ranges from 1 to 35 and averages between 15 and 20 for Illinois streams.

ANNOTATED LIST OF SPECIES

The 177 species in the following list represent 69 genera and 27 families. Of the 177 species, 169 have been taken in Illinois waters by me or my associates during the past 5 years. Eight (*Acipenser fulvescens, Scaphirhynchus albus, Lepisosteus spatula, Coregonus artedii, Salvelinus namaycush, Ictiobus niger, Lota lota,* and *Cottus ricei*) have not been recently encountered by us but are regarded as current members of the Illinois fauna.

Petromyzonidae—lampreys

Ichthyomyzon castaneus Girard—chestnut lamprey. Occasional in the Illinois, Wabash, Ohio, middle and lower Mississippi rivers and the lower reaches of their major tributaries.

Ichthyomyzon fossor Reighard & Cummins—northern brook lamprey. A record, based on one specimen from the Kankakee River in Kankakee County, needing substantiation.

Ichthyomyzon unicuspis Hubbs & Trautman—silver lamprey. Occasional in large rivers and lower reaches of their major tributaries throughout the state.

Lampetra lamottei (Lesueur)—brook lamprey. Sporadic in small and medium-sized streams throughout the state.

Petromyzon marinus Linnaeus—sea lamprey. Occasional in Lake Michigan.

Acipenseridae—sturgeons

Acipenser fulvescens Rafinesque—lake sturgeon. Occasional in Lake Michigan; sporadic in large rivers throughout Illinois.

Scaphirhynchus albus (Forbes & Richardson)—pallid sturgeon. Known from a few specimens taken in the Mississippi River a short distance above the mouth of the Missouri River.

Scaphirhynchus platorynchus (Rafinesque)—shovelnose sturgeon. Occasional in the Wabash, Ohio, and Mississippi rivers.

Polyodontidae—paddlefishes

Polyodon spathula (Walbaum)—paddlefish. Sporadic in the Wabash, Ohio, Mississippi, and Illinois rivers and the lower reaches of their major tributaries.

Lepisosteidae—gars

Lepisosteus oculatus (Winchell)—spotted gar. Sporadic in lakes, sloughs, and the lower reaches of large and medium-sized rivers throughout Illinois, except in the northwestern part.

Lepisosteus osseus (Linnaeus)—longnose gar. Generally distributed in large and medium-sized rivers throughout the state.

Lepisosteus platostomus Rafinesque—shortnose gar. Generally distributed in large and medium-sized rivers throughout Illinois, except the northeastern part.

Lepisosteus spatula Lacépède—alligator gar. Sporadic in the lower and middle Mississippi River.

Amiidae—bowfins

Amia calva Linnaeus—bowfin. Generally distributed in lakes, sloughs, and lower reaches of tributaries associated with large rivers throughout the state and in swampy streams of southern Illinois.

Anguillidae—eels

Anguilla rostrata (Lesueur)—American eel. Sporadic throughout Illinois, except the extreme northeastern part.

Clupeidae—herrings

Alosa alabamae Jordan & Evermann—Alabama shad. A record, based on one specimen from the Mississippi River in Monroe County, needing substantiation.

Alosa chrysochloris (Rafinesque)—skipjack herring. Occasional in the Wabash, Ohio, lower Mississippi, and Illinois rivers and in the lower reaches of their major tributaries; sporadic in the upper and middle Mississippi River.

Alosa pseudoharengus (Wilson)—alewife. Generally distributed along the shore of Lake Michigan.

Dorosoma cepedianum (Lesueur)—gizzard shad. Generally distributed throughout the state.

Dorosoma petenense (Günther)—threadfin shad. Generally distributed in the Ohio River and up the Mississippi River a few miles north of the confluence of the two rivers.

Hiodontidae—mooneyes

Hiodon alosoides (Rafinesque)—goldeye. Occasional in the Mississippi River and in large and medium-sized rivers in the southern half of the state.

Hiodon tergisus Lesueur—mooneye. Occasional in large and medium-sized rivers in the northern half of Illinois, except the extreme northeastern part; sporadic in the southern half of the state.

Salmonidae—trouts and whitefishes

Coregonus artedii Lesueur—cisco. Occasional in Lake Michigan; sporadic in the Illinois River.

Salmo gairdneri Richardson—rainbow trout. Sporadic in the extreme northern part of the state.

Salmo trutta Linnaeus—brown trout. Sporadic in the extreme northern part of the state.

Salvelinus namaycush (Walbaum)—lake trout. Occasional in Lake Michigan.

Osmeridae—smelts

Osmerus mordax (Mitchill)—American smelt. Generally distributed along the shore of Lake Michigan.

Umbridae—mudminnows

Umbra limi (Kirtland)—central mudminnow. Generally distributed in the extreme northern part of Illinois; occasional throughout the northern third; sporadic in the southern third; absent from central Illinois.

Esocidae—pikes

Esox americanus vermiculatus Lesueur—grass pickerel. Generally distributed throughout the southern and east-central parts of Illinois; sporadic in the extreme northern and western parts.

Esox lucius Linnaeus—northern pike. Occasional throughout the northern third of the state; sporadic in the middle Illinois River.

Cyprinidae—minnows and carps

Campostoma anomalum (Rafinesque) subspecies—stoneroller. Generally distributed throughout the state, except in the block of south-central counties just north of the Shawnee Hills.

Carassius auratus (Linnaeus)—goldfish. Generally distributed in the upper Illinois River and along the shore of Lake Michigan; sporadic elsewhere in the state.

Chrosomus erythrogaster (Rafinesque)—southern redbelly dace. Generally distributed throughout the northern third of Illinois; isolated colonies in extreme east-central and west-central Illinois.

Cyprinus carpio Linnaeus—carp. Generally distributed throughout the state and in Lake Michigan.

Dionda nubila (Forbes)—Ozark minnow. Occasional in the extreme northern part of the state; sporadic in the lower Mississippi River.

Ericymba buccata Cope—silverjaw minnow. Generally distributed in east-central Illinois; occasional in the extreme southwestern part.

Hybognathus hankinsoni Hubbs—brassy minnow. Sporadic in the extreme northern part of the state.

Hybognathus hayi Jordan—cypress minnow. Three records, based on one or a very few specimens from the lower Mississippi River, needing substantiation.

Hybognathus nuchalis nuchalis Agassiz—western silvery minnow. Generally distributed throughout Illinois, except the northeastern part.

Hybognathus placitus Girard—plains minnow. Occasional in the lower Mississippi River.

Hybopsis aestivalis (Girard) subspecies—speckled chub. Occasional in the Wabash, Ohio, Mississippi, and Illinois rivers and lower reaches of their major tributaries.

Hybopsis amblops amblops (Rafinesque) — northern bigeye chub. Sporadic in clear streams of the upper Wabash drainage system.

Hybopsis biguttata (Kirtland)—hornyhead chub. Generally distributed in the northern half of the state.

Hybopsis gelida (Girard)—sturgeon chub. Sporadic in the lower Mississippi River.

Hybopsis gracilis (Richardson)—flathead chub. Generally distributed in the Mississippi River below the mouth of the Missouri River.

Hybopsis meeki Jordan & Evermann—sicklefin chub. Occasional in the lower Mississippi River.

Hybopsis micropogon (Cope)—river chub. Known from the Wabash River in Lawrence and Clark counties.

Hybopsis plumbea (Agassiz) — lake chub. Sporadic along the shore of Lake Michigan.

Hybopsis storeriana (Kirtland)—silver chub. Generally distributed in large and medium-sized rivers throughout Illinois, except the northeastern part.

Hybopsis x-punctata Hubbs & Crowe—gravel chub. Occasional in the Rock River and its tributaries; sporadic in the Wabash and lower Mississippi rivers.

Notemigonus crysoleucas (Mitchill) — golden shiner. Generally distributed throughout the state.

Notropis amnis Hubbs & Greene—pallid shiner. Sporadic in the upper Mississippi River.

Notropis anogenus Forbes—pugnose shiner. Known from Channel Lake in northwestern Lake County.

Notropis atherinoides Rafinesque—emerald shiner. Generally distributed in Lake Michigan and in large and medium-sized rivers throughout Illinois.

Notropis blennius (Girard)—river shiner. Generally distributed in large rivers and lower reaches of their major tributaries throughout Illinois, except the northeastern part.

Notropis boops Gilbert—bigeye shiner. Occasional in the southern half of the state except the interior counties, where it is sporadic.

Notropis buchanani Meek—ghost shiner. Occasional in large rivers and lower reaches of their major tributaries throughout Illinois, except the northern and eastern counties.

Notropis chalybaeus (Cope)—ironcolor shiner. Generally distributed in the Kankakee drainage system; sporadic elsewhere in the northern half of the state.

Notropis chrysocephalus chrysocephalus (Rafinesque)—striped shiner. Generally distributed in the eastern and central parts of the state and in the Shawnee Hills of southern Illinois; apparently absent from northern, western, and south-central Illinois.

Notropis cornutus (Mitchill)—common shiner. Generally distributed throughout the northern fourth of the state.

Notropis dorsalis (Agassiz)—bigmouth shiner. Generally distributed throughout the northern three-fourths of the state, except in the upper Wabash drainage system.

Notropis fumeus Evermann—ribbon shiner. Two records, based on a very few specimens taken in creeks of Jasper County, needing substantiation.

Notropis heterodon (Cope)—blackchin shiner. Occasional in lakes of Lake and McHenry counties.

Notropis heterolepis Eigenmann & Eigenmann—blacknose shiner. Generally distributed in the Kankakee drainage system; sporadic elsewhere in the northern third of the state.

Notropis hudsonius (Clinton)—spottail shiner. Generally distributed in Lake Michigan, in the upper and middle Mississippi River, the Illinois River, and lower reaches of the major tributaries of these rivers; sporadic in the lower Mississippi River.

Notropis lutrensis (Baird & Girard)—red shiner. Generally distributed throughout Illinois, except in the extreme northeastern part and the Wabash drainage system.

Notropis rubellus (Agassiz)—rosyface shiner. Generally distributed in fast streams throughout the northern third and the extreme east-central part of the state.

Notropis shumardi (Girard)—silverband shiner. Generally distributed in the lower Mississippi and Ohio rivers and lower reaches of their major tributaries; occasional in the lower Illinois and the middle Mississippi rivers.

Notropis spilopterus (Cope) subspecies—spotfin shiner. Generally distributed in the Wabash and Ohio drainage systems and across the northern third of the state; occasional in the middle Mississippi River; apparently absent elsewhere from western Illinois.

Notropis stramineus stramineus (Cope)—northeastern sand shiner. Generally distributed throughout the northern four-fifths of Illinois; occasional in the extreme southeastern and southwestern counties, but absent from the south-central counties.

Notropis texanus (Girard)—weed shiner. Generally distributed in the Kankakee drainage system; sporadic elsewhere in the northern third of the state.

Notropis umbratilis (Girard) subspecies—redfin shiner. Generally distributed throughout the state.

Notropis venustus venustus (Girard)—northern blacktail shiner. Occasional in the Clear Creek drainage system

of Alexander and Union counties, where it hybridizes with *N. lutrensis;* sporadic in the lower Ohio River.

Notropis volucellus (Cope) subspecies—mimic shiner. Generally distributed in the Wabash, Ohio, and lower Mississippi rivers; sporadic in small streams of the extreme eastern part of the state.

Notropis whipplei (Girard)—steelcolor shiner. Occasional in the Sangamon and the upper Wabash drainage systems; sporadic in the southern half of the state.

Opsopoeodus emiliae Hay—pugnose minnow. Sporadic throughout the state.

Phenacobius mirabilis (Girard)—suckermouth minnow. Generally distributed throughout Illinois, except the extreme northeastern part.

Pimephales notatus (Rafinesque)—bluntnose minnow. Generally distributed throughout the state.

Pimephales promelas promelas Rafinesque — northern fathead minnow. Generally distributed throughout the northern four-fifths of the state, except in the Wabash and Kankakee drainage systems.

Pimephales vigilax perspicuus (Girard)—northern bullhead minnow. Generally distributed in large rivers and occasional in medium-sized rivers of Illinois; sporadic in the extreme northeastern part.

Rhinichthys atratulus meleagris Agassiz—western blacknose dace. Occasional throughout the northern third of the state and in small gravelly tributaries of the middle Illinois River; sporadic in the extreme eastern part of the state.

Rhinichthys cataractae (Valenciennes)—longnose dace. Generally distributed along the shore of Lake Michigan; sporadic in the extreme northwestern part of the state.

Semotilus atromaculatus (Mitchill)—creek chub. Generally distributed in small and medium-sized streams throughout the state.

Catostomidae—suckers

Carpiodes carpio carpio (Rafinesque)—northern river carpsucker. Generally distributed in large rivers and lower reaches of their major tributaries throughout Illinois, except the northeastern part.

Carpiodes cyprinus (Lesueur) subspecies — quillback. Generally distributed throughout the northern two-thirds of Illinois; occasional in the southern third of the state.

Carpiodes velifer (Rafinesque) — highfin carpsucker. Occasional in small rivers throughout Illinois, except the northeastern counties.

Catostomus commersoni (Lacépède) — white sucker. Generally distributed in small and medium-sized streams throughout the state.

Cycleptus elongatus (Lesueur)—blue sucker. Sporadic in the Wabash, Ohio, and Mississippi rivers and lower reaches of their major tributaries.

Erimyzon oblongus claviformis (Girard)—western creek chubsucker. Generally distributed throughout eastern, central, and southern parts of Illinois; apparently absent from the northern third of the state and extremely sporadic in the western counties.

Erimyzon sucetta (Lacépède)—lake chubsucker. Sporadic throughout Illinois; extremely rare, if present at all, in the central and southern counties.

Hypentelium nigricans (Lesueur)—northern hog sucker. Generally distributed throughout the northern, eastern, and central parts of the state; sporadic in western Illinois and apparently absent from the southern third of the state.

Ictiobus bubalus (Rafinesque) — smallmouth buffalo. Generally distributed in large and medium-sized rivers throughout Illinois, except the extreme northeastern part.

Ictiobus cyprinellus (Valenciennes)—bigmouth buffalo. Occasional in large and medium-sized rivers throughout Illinois, except the extreme northeastern part.

Ictiobus niger (Rafinesque)—black buffalo. Sporadic in large and medium-sized rivers throughout the state.

Minytrema melanops (Rafinesque) — spotted sucker. Sporadic throughout the state.

Moxostoma anisurum (Rafinesque) — silver redhorse. Occasional throughout the northern half of the state.

Moxostoma carinatum (Cope)—river redhorse. Sporadic in the extreme eastern part of the state.

Moxostoma duquesnei (Lesueur)—black redhorse. Two recent records, based on a few specimens from the Vermilion River in Vermilion County and Grand Pierre Creek in Pope County, needing substantiation.

Moxostoma erythrurum (Rafinesque)—golden redhorse. Generally distributed throughout the northern two-thirds of the state; occasional in the southern third.

Moxostoma macrolepidotum (Lesueur)—northern redhorse. Generally distributed throughout the state, except in the southern tip.

Moxostoma valenciennesi Jordan—greater redhorse. A record, based on one specimen from the Fox River in Kane County, needing substantiation.

Ictaluridae—catfishes and bullheads

Ictalurus furcatus (Lesueur)—blue catfish. Occasional in the lower Wabash, Ohio, and Mississippi rivers and lower reaches of their major tributaries.

Ictalurus melas (Rafinesque)—black bullhead. Generally distributed throughout the state.

Ictalurus natalis (Lesueur)—yellow bullhead. Generally distributed throughout the state.

Ictalurus nebulosus (Lesueur)—brown bullhead. Generally distributed in Fox Chain O'Lakes; occasional in marginal lakes of the middle Illinois River; sporadic in the lower Mississippi River and lower reaches of its tributaries and associated swamps.

Ictalurus punctatus (Rafinesque)—channel catfish. Generally distributed in large and medium-sized rivers throughout the state.

Noturus eleutherus Jordan—mountain madtom. Generally distributed in gravelly riffles of the Wabash River; sporadic in lower reaches of its major tributaries.

Noturus exilis Nelson—slender madtom. Sporadic in gravelly streams throughout Illinois, except the eastern part.

Noturus flavus Rafinesque—stonecat. Generally distributed throughout the northern half of the state; occa-

sional in the Wabash River; sporadic in the lower Mississippi River and lower reaches of its major tributaries.

Noturus gyrinus (Mitchill)—tadpole madtom. Generally distributed throughout the state.

Noturus miurus Jordan—brindled madtom. Generally distributed in the upper Wabash drainage system; sporadic in the lower Wabash and Ohio drainage systems.

Noturus nocturnus Jordan & Gilbert—freckled madtom. Generally distributed in the Kaskaskia River; sporadic elsewhere in the southern two-thirds of the state.

Noturus species—undescribed madtom. Known from the lower Vermilion River in Vermilion County and the Wabash River in Wabash County.

Pylodictis olivaris (Rafinesque)—flathead catfish. Occasional in large and medium-sized streams throughout Illinois, except the northeastern part.

Percopsidae—trout-perches

Percopsis omiscomaycus (Walbaum)—trout-perch. Occasional in Lake Michigan and the middle Illinois River; sporadic in the Mississippi River and its lesser tributaries.

Aphredoderidae—pirate perches

Aphredoderus sayanus (Gilliams)—pirate perch. Generally distributed throughout the southern part of Illinois; occasional in the east-central counties; sporadic in northern and central Illinois.

Amblyopsidae—cavefishes

Chologaster agassizi Putnam—spring cavefish. Known at present only from springs in northwestern Union County.

Gadidae—codfishes

Lota lota (Linnaeus)—burbot. Occasional in Lake Michigan; sporadic in the Mississippi and Illinois rivers and lower reaches of their major tributaries.

Cyprinodontidae—topminnows

Fundulus diaphanus menona Jordan & Copeland—banded killifish. Occasional in lakes of Lake and McHenry counties.

Fundulus notti *dispar* (Agassiz)—northern starhead topminnow. Sporadic in northeastern Illinois, the middle Illinois River valley, and swamps in northwestern Union County.

Fundulus notatus (Rafinesque)—blackstripe topminnow. Generally distributed throughout the southern three-fourths of the state, except for the upland streams in the Shawnee Hills of southern Illinois; occasional in the northern fourth of the state.

Fundulus olivaceus (Storer)—blackspotted topminnow. Generally distributed throughout the Shawnee Hills of southern Illinois; occasional in the bordering counties north of the Shawnee Hills.

Poeciliidae—livebearers

Gambusia affinis affinis (Baird & Girard)—mosquitofish. Generally distributed throughout the southern third of the state; occasional in the lower and middle Illinois River valley; sporadic elsewhere through introductions.

Atherinidae—silversides

Labidesthes sicculus (Cope)—brook silverside. Occasional throughout the state.

Gasterosteidae—sticklebacks

Culaea inconstans (Kirtland)—brook stickleback. Generally distributed in small streams throughout most of the northern fourth of the state.

Pungitius pungitius (Linnaeus)—ninespine stickleback. Occasional along the shore of Lake Michigan.

Serranidae—sea basses

Roccus chrysops (Rafinesque)—white bass. Generally distributed in the Mississippi, Illinois, and Ohio rivers and lower reaches of their major tributaries; sporadic in other large and medium-sized rivers.

Roccus mississippiensis (Jordan & Eigenmann)—yellow bass. Sporadic throughout the state; occasional in artificial lakes, where it has been introduced.

Centrarchidae—sunfishes

Ambloplites rupestris rupestris (Rafinesque)—northern rock bass. Generally distributed in the northern, central, and eastern parts of Illinois; occasional in western Illinois but sporadic west of the Illinois River and throughout the southern half of the state.

Centrarchus macropterus (Lacépède)—flier. Generally distributed in swamps and sluggish streams in the southern fourth of the state.

Chaenobryttus gulosus (Cuvier)—warmouth. Occasional throughout the state.

Elassoma zonatum Jordan—banded pygmy sunfish. Presently known only from swamps in northwestern Union County.

Lepomis cyanellus Rafinesque—green sunfish. Generally distributed in creeks throughout the state.

Lepomis gibbosus (Linnaeus)—pumpkinseed. Occasional throughout the northern third of the state; sporadic in the middle Illinois River valley.

Lepomis humilis (Girard)—orangespotted sunfish. Occasional throughout the state.

Lepomis macrochirus macrochirus Rafinesque—northern bluegill. Generally distributed throughout the state.

Lepomis megalotis (Rafinesque) subspecies—longear sunfish. Generally distributed throughout the southern third of the state and the Wabash drainage system; sporadic in the Illinois River valley and in northeastern Illinois.

Lepomis microlophus (Günther)—red-ear sunfish. Sporadic in the southern and central parts of the state; all populations, except those in the extreme southern tip of Illinois, the result of introduction.

Lepomis punctatus miniatus (Jordan)—western spotted sunfish. Sporadic in the Illinois River valley.

Lepomis symmetricus Forbes—bantam sunfish. Presently known only from swamps in northwestern Union County.

Micropterus dolomieui Lacépède—smallmouth bass. Generally distributed throughout the northern half of Illinois; sporadic in the extreme southern part.

Micropterus punctulatus punctulatus (Rafinesque)—northern spotted bass. Generally distributed in the upper Wabash drainage system, the lower Wabash and Ohio rivers, and across the southern tip of the state.

Micropterus salmoides salmoides (Lacépède)—northern largemouth bass. Generally distributed throughout the state.

Pomoxis annularis Rafinesque—white crappie. Generally distributed in lakes and rivers throughout the state.

Pomoxis nigromaculatus (Lesueur)—black crappie. Generally distributed in lakes and rivers throughout the state.

Percidae—perches and darters

Ammocrypta clara Jordan & Meek—western sand darter. Sporadic in the upper and middle Mississippi and middle Kaskaskia rivers.

Ammocrypta pellucida (Baird)—eastern sand darter. Sporadic in the upper Wabash drainage system and in the Ohio River.

Etheostoma asprigene (Forbes)—mud darter. Sporadic in large and medium-sized streams throughout the state, except in northeastern Illinois.

Etheostoma blennioides Rafinesque—greenside darter. Generally distributed in gravelly riffles of the upper Wabash drainage system; a recent record from the Lake Michigan drainage system, based on one specimen, needing substantiation.

Etheostoma caeruleum Storer—rainbow darter. Generally distributed in gravelly riffles of the extreme northern, eastern, and southern parts of Illinois; absent from western and most of central Illinois.

Etheostoma camurum (Cope)—bluebreast darter. Known only from the lower Middle Fork in Vermilion County.

Etheostoma chlorosomum (Hay)—bluntnose darter. Generally distributed in swamps and sluggish creeks of the southern third of the state; occasional in the middle Illinois River; sporadic in the upper Mississippi River.

Etheostoma exile (Girard)—Iowa darter. Sporadic in the northern fourth of the state; known also from deep quarries in southern Vermilion County.

Etheostoma flabellare Rafinesque subspecies—fantail darter. Generally distributed in the northern fourth of Illinois; occasional throughout the northern half of the state and in east-central and extreme southwestern counties.

Etheostoma gracile (Girard)—slough darter. Generally distributed throughout the southern third of the state, except the western counties.

Etheostoma histrio Jordan & Gilbert—harlequin darter. Known only from the middle Embarras River in Cumberland and Jasper counties.

Etheostoma kennicotti (Putnam)—stripetail darter. Generally distributed in clear gravelly streams in the extreme southeastern part of the state.

Etheostoma microperca Jordan & Gilbert—least darter. Occasional throughout the northeastern part of the state.

Etheostoma nigrum Rafinesque subspecies—johnny darter. Generally distributed throughout the state.

Etheostoma proeliare (Hay)—cypress darter. Sporadic in the extreme southern part of the state.

Etheostoma spectabile spectabile (Agassiz)—orangethroat darter. Generally distributed in the southern, eastern, and western parts of Illinois; apparently absent from the extreme northern counties and from much of the central part of the state.

Etheostoma squamiceps Jordan—spottail darter. Generally distributed in clear streams of the extreme southeastern part of the state; occasional in small streams of Union County.

Etheostoma zonale (Cope)—banded darter. Occasional throughout the northern half of Illinois, except the western part.

Perca flavescens (Mitchill)—yellow perch. Generally distributed in Lake Michigan; occasional in the northern fourth of the state, the middle Illinois River, and the upper and middle Mississippi River; elsewhere present only where introduced.

Percina caprodes (Rafinesque) subspecies—logperch. Occasional throughout the state and in Lake Michigan.

Percina maculata (Girard)—blackside darter. Generally distributed in the eastern two-thirds of Illinois; sporadic in western counties of the state.

Percina phoxocephala (Nelson)—slenderhead darter. Occasional throughout Illinois, except the extreme northeastern part and the southern tip of the state.

Percina sciera sciera (Swain)—northern dusky darter. Generally distributed in the Middle Fork and Embarras rivers; sporadic elsewhere in the Wabash and Ohio drainage systems.

Percina shumardi (Girard)—river darter. Generally distributed in riffles of the Mississippi River and lower reaches of its major tributaries; sporadic in the Illinois, Ohio, and Wabash rivers.

Stizostedion canadense (Smith)—sauger. Occasional in the Mississippi, Ohio, and Wabash rivers and lower reaches of their major tributaries.

Stizostedion vitreum vitreum (Mitchill)—yellow walleye. Occasional in the upper and middle Mississippi River and lower reaches of its major tributaries; sporadic in the southern half of the state.

Sciaenidae—drums

Aplodinotus grunniens Rafinesque—freshwater drum. Generally distributed in large rivers and occasional in medium-sized rivers throughout the state.

Cottidae—sculpins

Cottus bairdi Girard—mottled sculpin. Sporadic in spring-fed streams in the northeastern part of the state.

Cottus carolinae (Gill)—banded sculpin. Sporadic in spring-fed streams in the extreme western and southern parts of the state.

Cottus cognatus Richardson—slimy sculpin. Known only from deep water of Lake Michigan off shore from Chicago.

Cottus ricei (Nelson)—spoonhead sculpin. Sporadic in deep water of Lake Michigan.

Myoxocephalus quadricornis (Linnaeus)—fourhorn sculpin. Known only from deep water of Lake Michigan off shore from Chicago.

PROBLEMATICAL LIST

The 35 species in the following list of hypothetical additions to the Illinois fauna represent 18 genera and 11 families.

Petromyzonidae—lampreys

Ichthyomyzon bdellium (Jordan)—Ohio lamprey. Apparently extirpated; formerly in the Wabash and Ohio drainage systems, but not collected in the state since 1917.

Clupeidae—herrings

Alosa sapidissima (Wilson)—American shad. Extirpated; attempts to introduce the species in the northern part of the state in the late 19th century unsuccessful.

Salmonidae—trouts and whitefishes

Coregonus alpenae (Koelz)—longjaw cisco. Not recorded from Illinois waters, but presumably occurring formerly in deep water of southwestern Lake Michigan.

Coregonus clupeaformis (Mitchill)—lake whitefish. Presumably still occurring in deep water of southwestern Lake Michigan.

Coregonus hoyi (Gill)—bloater. Presumably occurring in deep water of southwestern Lake Michigan.

Coregonus johannae (Wagner)—deepwater cisco. Not recorded from Illinois waters, but presumably occurring formerly in deep water of southwestern Lake Michigan.

Coregonus kiyi (Koelz)—kiyi. Not recorded from Illinois waters, but presumably occurring in deep water of southwestern Lake Michigan.

Coregonus nigripinnis (Gill)—blackfin cisco. Not recorded from Illinois waters, but presumably occurring formerly in deep water of southwestern Lake Michigan.

Coregonus reighardi (Koelz)—shortnose cisco. Not recorded from Illinois waters, but presumably occurring in deep water of southwestern Lake Michigan.

Coregonus zenithicus (Jordan & Evermann)—shortjaw cisco. Not recorded from Illinois waters, but presumably occurring in deep water of southwestern Lake Michigan.

Prosopium cylindraceum quadrilaterale (Richardson)—round whitefish. Presumably still occurring in deep water of southwestern Lake Michigan.

Salvelinus fontinalis (Mitchill)—brook trout. Extirpated; repeated attempts to introduce the species in the northern part of the state unsuccessful.

Esocidae—pikes

Esox masquinongy Mitchill—muskellunge. Probably extirpated; formerly occurring in lakes of northeastern Illinois (Nelson 1876:43) and may still occur in southwestern Lake Michigan.

Esox niger Lesueur—chain pickerel. Recently introduced in northern and central parts of the state by Illinois Natural History Survey personnel; status of plantings as yet unknown.

Cyprinidae—minnows and carps

Chrosomus eos Cope—northern redbelly dace. Recently introduced in the northeastern part of the state by South Cook County Mosquito Abatement District personnel; status of plantings as yet unknown; possibly occurring naturally in Lake and McHenry counties, in view of its reported occurrence in adjacent Kenosha County, Wisconsin (Greene 1935:123).

Gila elongata (Kirtland)—redside dace. Credited by Forbes (1884:74), on authority of David Starr Jordan, to the Rock River, but records not accepted by subsequent authors; possibly occurring in Stephenson and Winnebago counties, in view of its known occurrence in adjacent Green County, Wisconsin (INHS).

Notropis ariommus (Cope)—popeye shiner. Expected in Illinois by Jordan (1878:60), but no records yet available; possible in extreme eastern and western parts of the state, in view of its reported occurrence in nearby Parke County, Indiana (Eigenmann & Beeson 1894:89), and its known occurrence in adjacent Perry County, Missouri (INHS).

Notropis photogenis (Cope)—silver shiner. Said to occur, but without documentation, in bottomland lakes near Brookport, Massac County (O'Donnell 1935:482).

Notropis zonatus (Agassiz)—bleeding shiner. Not recorded from Illinois waters, but possible in the southwestern part of the state, in view of its known occurrence in adjacent St. Louis, Jefferson, Ste. Genevieve, and Perry counties, Missouri (INHS).

Semotilus margarita nachtriebi (Cox)—northern pearl dace. Not recorded from Illinois waters, but possible in Stephenson and Winnebago counties, in view of its reported occurrence in adjacent Rock County, Wisconsin (Greene 1935:84).

Catostomidae—suckers

Catostomus catostomus catostomus (Forster)—eastern longnose sucker. Recorded from Rock River, Ogle County, as *C. hudsonius* by Nelson (1876:48) and from Lake Michigan as *C. longirostrum* by Jordan (1878:64), but records not accepted by subsequent authors; presumably occurring in Lake Michigan off Lake and Cook counties, in view of its reported occurrence in the Indiana waters of Lake Michigan (Gerking 1945:40).

Cyprinodontidae—topminnows

Fundulus catenatus (Storer)—northern studfish. Not recorded from Illinois waters, but possible in the southwestern part of the state, in view of its known occurrence in adjacent St. Louis, Ste. Genevieve, Perry, and Cape Girardeau counties, Missouri (INHS).

Melanotaeniidae—rainbow fishes

Melanotaenia nigrans Richardson—Australian rainbow fish. Extirpated; presumed escapes from a tropical fish store were taken in the Mississippi River in Randolph County in 1930 (O'Donnell 1935:491).

Atherinidae—silversides

Menidia audens Hay—Mississippi silverside. Not recorded from Illinois waters, but probable in the lower Mississippi River, in view of its known occurrence in the Mississippi River in adjacent Mississippi County, Missouri (W. L. Pflieger, personal communication).

Percidae—perches and darters

Ammocrypta asprella (Jordan)—crystal darter. Probably extirpated, although still known to occur in adjacent St. Louis County, Missouri (INHS); formerly occurring in the Rock River and in clear streams of Effingham, Jo Daviess, and Hancock counties, but not collected in the state since 1900.

Ammocrypta vivax Hay—scaly sand darter. Not recorded from Illinois waters, but possible in the southwestern part of the state, in view of its known occurrence in adjacent Cape Girardeau County, Missouri (W. L. Pflieger, personal communication).

Etheostoma stigmaeum (Jordan)—speckled darter. Not recorded from Illinois waters, but possible in the southern part of the state, in view of its known occurrence in nearby Marshall County, Kentucky (INHS) and in adjacent Cape Girardeau County, Missouri (W. L. Pflieger, personal communication).

Percina copelandi (Jordan)—channel darter. Not recorded from Illinois waters, but possible in the upper Wabash River drainage, in view of its reported occurrence in nearby Fountain and Warren counties, Indiana (Gerking 1945:88).

Percina evides (Jordan & Copeland)—gilt darter. Apparently extirpated; formerly occurring in the Rock River, but not collected in the state since 1932.

Percina uranidea (Jordan & Gilbert)—stargazing darter. Recorded many years ago from the Wabash River in adjacent Knox and Posey counties, Indiana (Jordan 1890: 164); possible in the extreme southwestern part of Illinois, in view of its known occurrence in adjacent Scott County, Missouri (INHS).

Cichlidae—cichlids

Tilapia species—tilapias. A limited number of recent introductions of the species *mossambica, macrocephala, melanopleura, nigra,* and *sparmanni* in ponds near Dundee, Champaign, and Carbondale by personnel of the Fin 'n Feather Club, Illinois Natural History Survey, and Southern Illinois University, respectively, but no evidence of overwintering.

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